The Walleye

by the Walleye Committee: Ed Steinkoenig, Tom Hampton, Steve Reeser, and Bob Greenlee illustrations by Spike Knuth photos by Dwight Dyke

he walleye is the largest member of the perch family. It is native to Southwest Virginia (Tennessee and Big Sandy drainage) and has been stocked into Virginia's rivers, lakes, and reservoirs since the mid-1960s. The Virginia Department of Game and Inland Fisheries (VDGIF) stocks approximately 1.5 million walleye fingerlings (average 1" in length) each year. Even though large numbers of walleye are stocked, the estimated annual catch is probably less than 10,000 fish! VDGIF estimates it costs approximately 19 cents to rear and stock a walleye. Why would we continue to stock them if they are expensive to raise and so few are caught? In addition to their angling value and excellent table fare, fisheries biologists believe walleye are important to the biological health of rivers, lakes, and reservoirs. They are efficient predators, controlling overabundant white perch and sunfish populations. Walleye readily adapt to a variety of different habitats. They have a rapid growth rate, and they grow to a large (trophy) size, providing unique angling opportunities for Virginia's anglers.

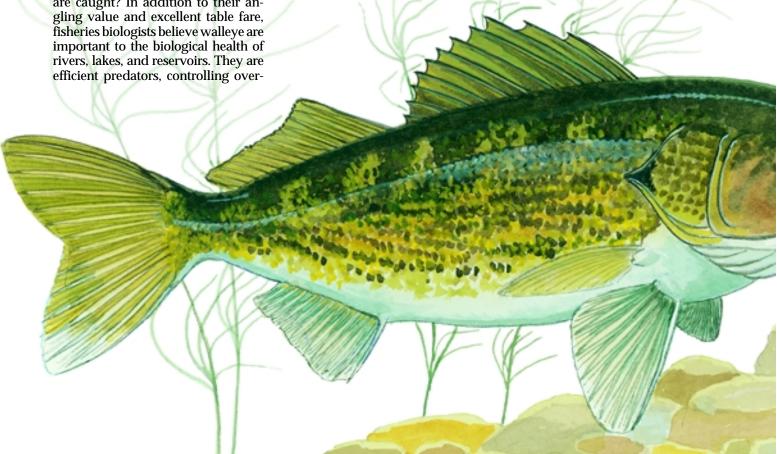
Biologists and anglers alike have learned a lot about walleye population dynamics in Virginia, including habitat types, forage availability, age and growth analyses, and angler harvest data. Lake sampling over several years has identified many good walleye populations throughout Virginia. In spite of the good populations, few anglers successfully catch walleye, largely due to lack of knowledge about habitats and movements.

To learn more about their lifestyles, fisheries biologists initiated a statewide study that included small lakes and large reservoirs.

There were several objectives to this study:

- 1.) Determine walleye habitat preferences and seasonal movements at three small impoundments (Brittle, Hungry Mother, Frederick) and one reservoir (Whitehurst) using ultrasonic tags.
- 2.) Determine walleye habitat preferences and seasonal movements in Lake Anna using radio tags.
- 3.) Determine angler exploitation (harvest) rates at lakes Whitehurst, Brittle, Frederick, and Hungry Mother
- 4.) Publish reports and maps for angler use to identify walleye habits and to increase angler harvest.

Ultrasonic tags were surgically inserted into walleye in lakes Brittle, Hungry Mother, Frederick, and Whitehurst. Walleye were tracked weekly during the day for approximately 14 months. Nighttime move-



in Virginia

ments were determined by tracking for 24 hours one day each month. All tags had a unique aural code that made them self-identifying. Tags were temperature sensitive, measured 2.5 inches in length, and weighed approximately 0.25 ounce. Tags had a battery life of 12-14 months. Water temperature was measured at 3-foot intervals from surface to bottom during each tracking session, and water clarity was measured using a Secchi disk. Notations about habitat features (standing timber, rip rap, brush, rocky ledge, etc.) were associated with each walleye location.

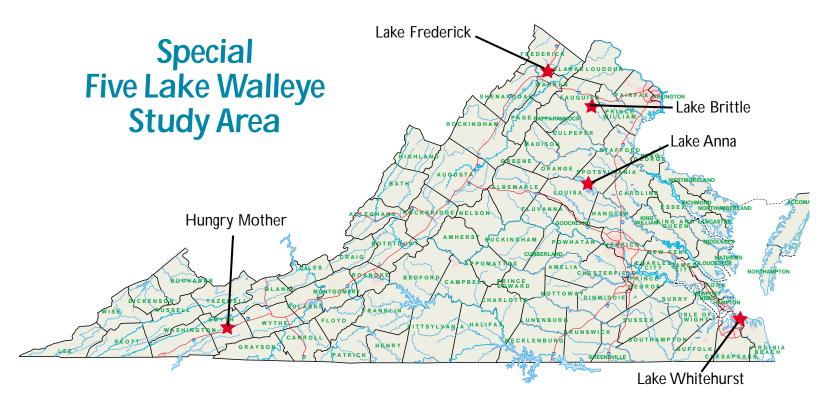
Walleye movements and habitat preferences in Lake Anna were determined using temperature sensitive radio tags. Fourteen walleye were tracked weekly during the day for approximately 12 months. Tags had the same specifications described for the ultrasonic tags, except their radio signals were monitored from a moving boat, while the ultrasonic signals could only be monitored with a transducer held underwater from a boat that was not moving.

Walleyes were tagged with Floy anchor tags to determine angler exploitation (utilization) rates at all the study lakes. Each walleye was tagged with a Floy anchor tag that was marked with a unique numeric code and the message "Reward Call (XXX) XXX-XXXX." In addition to the Floy tagging, mail-in questionnaires were randomly handed out at each lake to estimate the non-reporting rate. Questionnaires stated that anglers would receive a reward for returning it. To receive the reward, the questionnaire had to be folded, stapled, stamped, and mailed to the local VDGIF Office. Data forms and information posters were distributed to local tackle shops and stores to promote tag returns. Anglers who returned walleye tags or questionnaires were given an embroidered baseball cap as a reward. \square





Few anglers catch walleye in Virginia, even though they have been stocked throughout the state since the mid-1960's. Fisheries biologists initiated a statewide study, and they have been sampling rivers, lakes, and reservoirs to learn more about the lifestyles of walleye and to raise awareness of this illusive sport fish.



Lake Frederick

ake Frederick is a 117-acre impoundment located in Frederick County, south of Winchester. The lake was acquired by VDGIF in the early 1980's, and opened to the public in February 1990. The lake is moderately productive and has a maximum depth of 35 feet. Initial fisheries management began with fish stocking as the reservoir came to full pool. Fish species that have been stocked in Lake Frederick include: largemouth bass, bluegill, redear sunfish, black crappie, walleye, northern pike, and channel catfish. Walleye and channel catfish populations continue to be maintained by annual stockings. Facilities at Lake Frederick include a parking lot, concrete boat ramp with courtesy dock, and a handicapped accessible fishing pier. Ample bank access is also available to shoreline anglers.

available to shoreline anglers.

Walleye in Lake Frederick utilized all areas of the reservoir throughout the year. The specific locations they preferred generally varied, depending upon the time of year and water temperature. They generally occupied deep, open water between 25–30 feet during the winter months. These winter
each fish

= 5% of walleye location

The more fish in an area

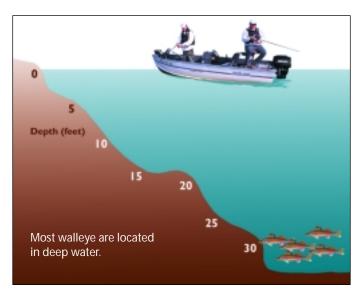
Areas of Lake Frederick

February-April.

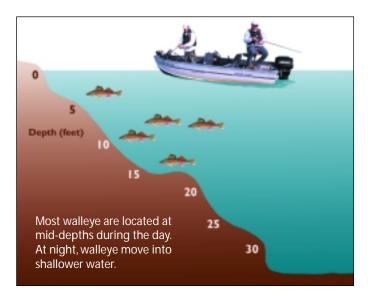
where walleye were located,

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increases an anglers chance of catching a walleye.

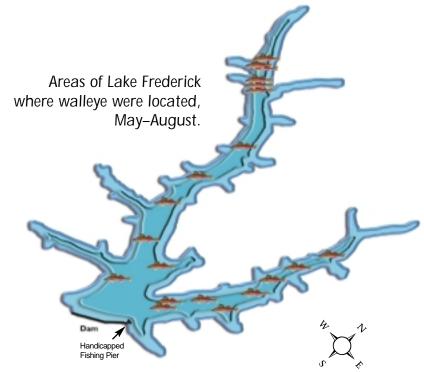


Depths walleye were located in Lake Frederick, November–January.



Depths walleye were located in Lake Frederick, February–June.

ing areas were located in the main channel at the lower end of the reservoir. In early spring, when water temperatures entered the upper 40's, walleye moved to two primary locations to attempt to spawn. Even though walleye in Lake Frederick do not spawn successfully, they do exhibit spawning behavior. Walleye spawn on rocky shoals or shorelines in natural lakes within their native range. The "rip-rap" across the breast of the dam of Lake Frederick is the kind of habitat that attracted walleye attempting to spawn. Another area where wall-





Lake Frederick is the largest public fishing lake in the Shenandoah Valley. Facilities include ample parking, boat ramp, handicapped accessible fishing pier; and the lake is open 24 hours a day for anglers.



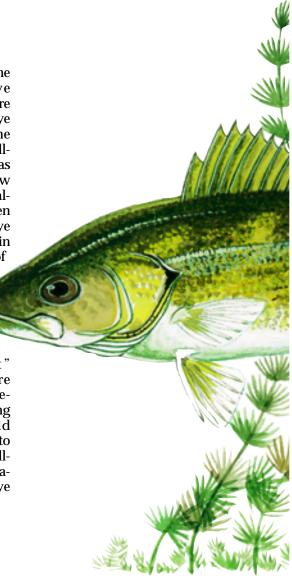
Anglers who target walleye will find they prefer the deeper and darker areas of the lake during the day. During the night hours walleye become more active, as they forage for food.

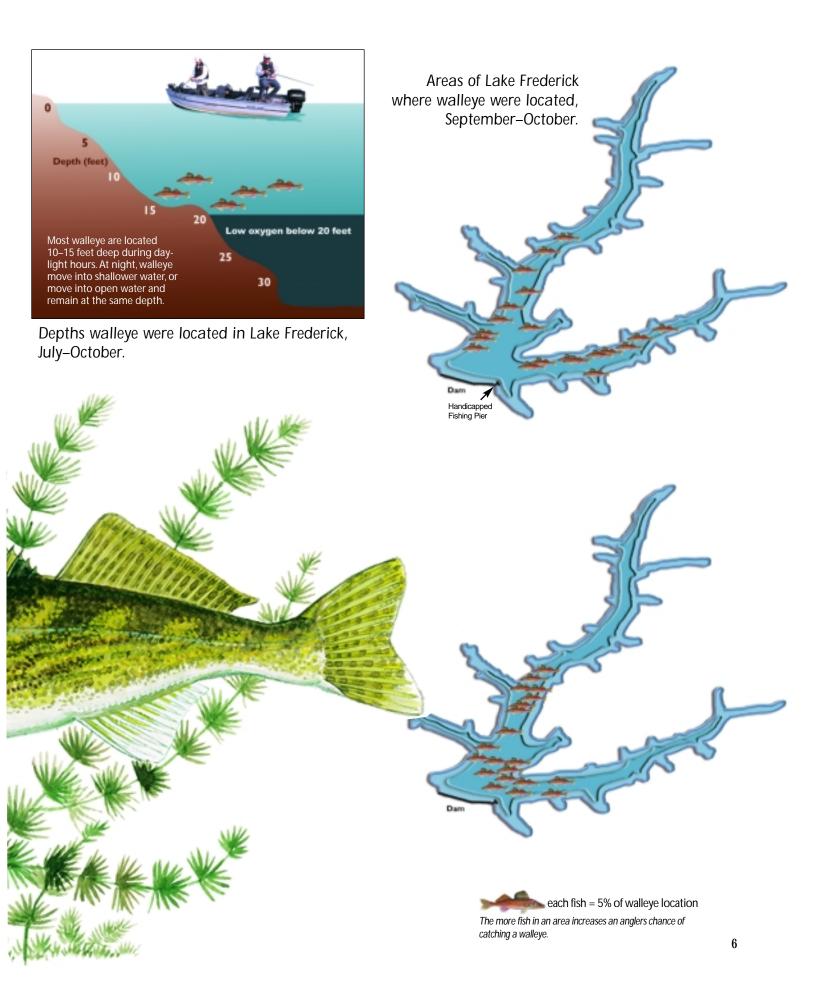
eye congregated during this period was midway up the west arm of the reservoir. From the pre-spawn period through early summer walleye were associated with the shoreline in water 2–15 feet deep. Walleye were generally located throughout the entire reservoir during the summer months. One particular area that had a concentration of walleye during this time period was at the head of the reservoir's western arm. An important fact for anglers to consider is that from July through early October Lake Frederick becomes thermally stratified. This means that water below 20 feet deep becomes void of dissolved oxygen. Walleye were never found in this zone of low oxygenated water. As fall approached and water temperatures decreased, walleye slowly moved back into the main body of the reservoir, seeking deeper water.

Throughout the year walleye preferred to hide in the submerged standing timber that covers much of the mid-depth regions of the reservoir. The exception was during the winter months when walleye sought deeper, "open" water where they became "suspended." Walleye are very sensitive to light. In the clear waters of Lake Frederick walleye preferred to hide in dark areas during daylight hours. These "low light" areas of the lake were generally full of submerged timber. When the water remained clear, walleye would wait until nighttime to begin to forage. Walleye are at the top of the food chain in Lake Frederick and feed primarily on other fish. The most abundant prey items in the lake were small crappie and sunfish. Unlike largemouth bass and chain pickerel that are "lie and wait" ambush predators, walleye are "cruising" predators. Walleye remained stationary in cover during daylight hours and then would move around the lake after dark to feed. On their nightly ventures walleve would sometimes swim the majority of the lake. Certain walleye

would even return to the same "daylight" location day after day.

Fisheries biologists tagged walleye in Lake Frederick with external floy tags between 1997 and 1998 to determine the number of walleye that were being harvested each year from the lake. Anglers who caught a tagged fish were asked to report information about their catch. Date, time of day, location, depth, species fished for, and bait type used were the types of information recorded for each walleye caught by anglers. No trends were observed from the data collected by anglers who were successful in catching walleye. Based on the number of tags returned, it was estimated that a low percentage of the total walleye population in Lake Frederick is harvested each year. \square





Lake Brittle

ake Brittle is a 77-acre impoundment located in Fauquier County, Virginia. The lake was impounded in 1953 and is owned by VDGIF. Maximum depth is 25 feet with a mean depth of 6 feet. The lake is fertilized with a liquid fertilizer (10-34-0) to increase productivity. Fishing pressure is high, averaging 636 hrs/acre, or 10,000 fishermen visits/year. The lake is thermally stratified, and there is no oxygen below 10 feet from May through October. Walleyes have been stocked into Lake Brittle since 1979. The stocking rate has been 50/acre. Other species stocked into Lake Brittle include: largemouth bass, bluegill, redear sunfish, channel catfish, blue catfish, flathead catfish, muskellunge, and tiger muskellunge.

Walleye were very active during the study, almost to the point of continuous movement. However, they did exhibit a preference for the lower (deeper) end of the lake. Walleye were located in water depths ranging from 1-13 feet, and temperatures ranging from 45-87°F. Fish were usually located in open, featureless water. Occasionally they were near submerged brush (fish at-



Nestled just south of our Nation's Capital, Lake Brittle offers a peaceful setting for anglers and wildlife watchers alike.

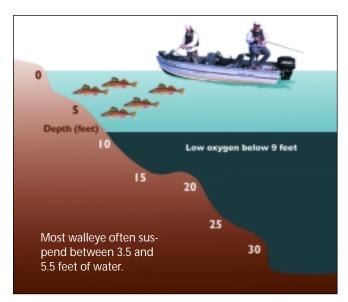
tractor), but at least 90 percent of the time they were not oriented to any structure. During the summer months they were located at the thermocline (4–5 feet), where water temperature is cooler and there is still adequate oxygen. Water visibility (clarity) during summer months

was less than 30 inches, and walleye were as active during daylight hours as they were at night. No walleye were located in the upper part of the lake during the summer months (June-August), and were found in the upper lake only 6 percent of the time throughout the year. They were mid-lake about 31 percent of the time. Most of their time was spent in the lower lake (63 percent), specifically on the north end of the dam in approximately 5 feet of water. The walleye stayed in water between 3-5 feet in depth; 3 feet in April, 5 feet in May and June, 4 feet in July, and 4 feet in August and September.

Concession

Areas of Lake Brittle where walleye were located from April–December 1998.

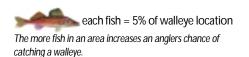
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Depths walleye were located in Lake Brittle, in 1998.

Brittle is fertilized during the summer, which gives the water a green, "pea soup" color and reduces water clarity. Sunlight generally doesn't penetrate deeper than 25 inches, which is probably why Lake Brittle walleye are found in shallow water.

Fisheries biologists tagged 72 walleye at Lake Brittle in 1998 with external Floy tags to estimate the number of walleye harvested from angling. Walleye were collected with trap nets and by electrofishing during March and April. Tags from six of the 72 tagged walleye were returned during calendar year 1998, for an estimated angler harvest rate of 8.3 percent. Two anglers who fish Lake Brittle almost daily during the spring caught five of these. They were caught between the hours of 11:00 a.m. and 1:00 p.m. March and April are the best months to catch walleye at Lake Brittle. □







Various tagging devices are used by fisheries biologists to track the movements and habitat preferences of walleye. This allows biologists to follow individual walleye over long periods of time to collect important data.

Hungry Mother Lake

ungry Mother Lake is a 108-acre impoundment located within Hungry Mother State Park in Smyth County. The lake has a maximum depth of 32 feet and a mean depth of 15 feet. The impoundment offers a diversity of shoreline habitats, ranging from gentle sloping banks with tree and brush cover to steep rock bluffs. The water is moderately clear, with normal visibility ranging from about 3 feet in spring to over 10 feet in late summer.

Walleyes were first stocked into Hungry Mother Lake in 1981 to control an overabundant sunfish population. Walleye effectively reduced the sunfish population, and a popular sport fishery developed. Alewives were stocked in 1988 to provide supplemental forage. Periodic fingerling stockings maintain the walleye fishery.

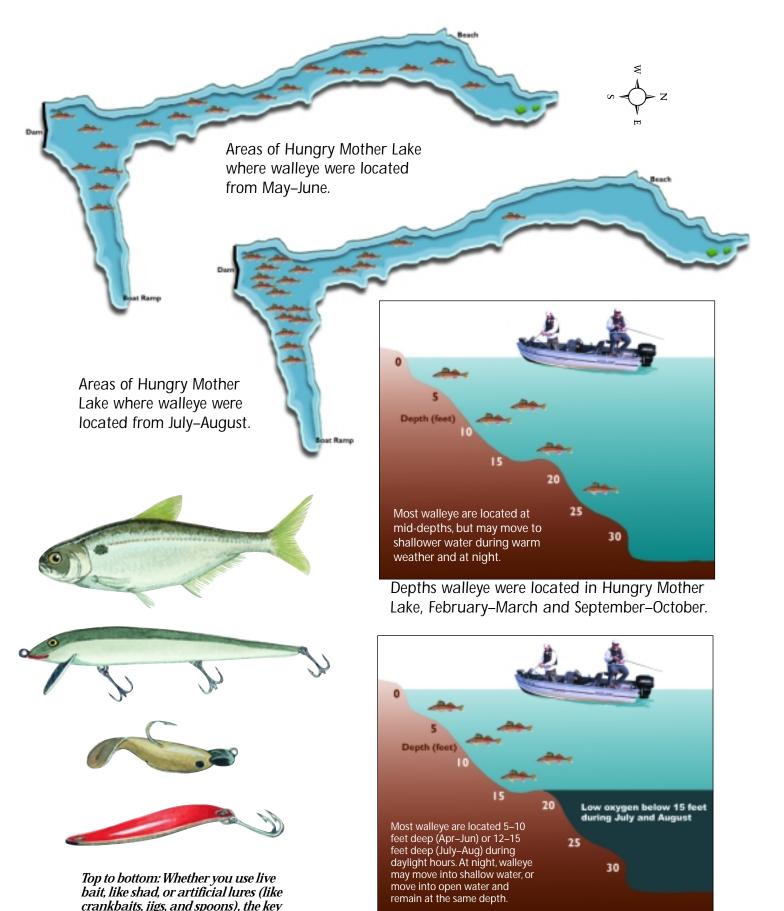
The two-year tracking study, June 1998 through June 2000, vielded data from 1,275 walleye locations. Walleye location within the reservoir changed dramatically through the seasons. Tagged fish congregated in the lower section of the reservoir during the winter and summer, but spread throughout the lake during the spring and fall. Walleye occupied a range of temperatures (41-77° F) and depths (0-28 feet) during the study period. Although they typically inhabited depths less than 15 feet, walleye moved to deep water during the winter months. Overall, submerged trees were the favorite habitat type (54 percent of locations), followed by open water without any visible structure (40 percent of locations). Walleye utilized rock habitat infrequent-



When it comes to bringing home dinner, walleye are hard to beat.



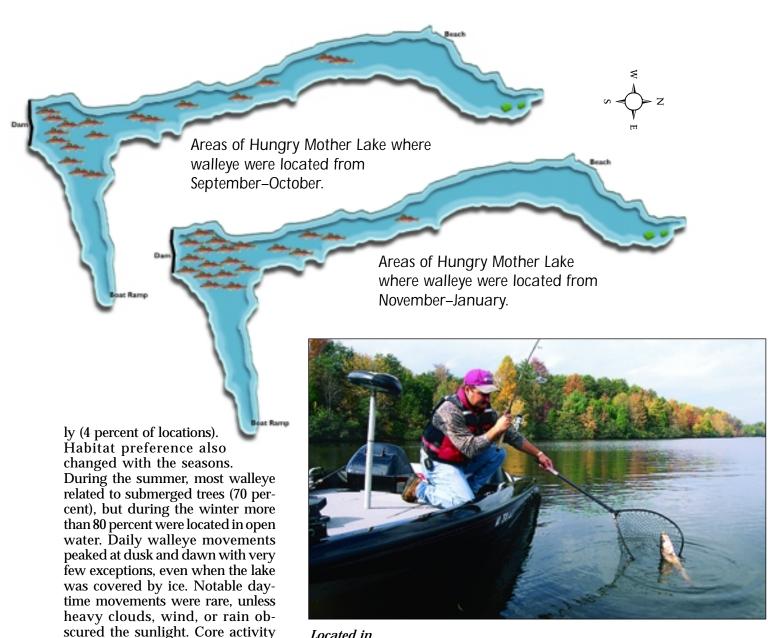
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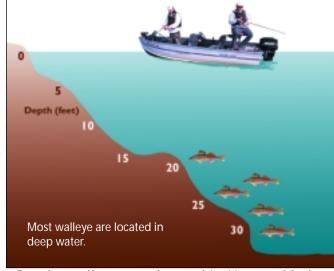
Top to bottom: Whether you use live bait, like shad, or artificial lures (like

crankbaits, jigs, and spoons), the key to catching walleye is good presenta-tion of your bait or lure.

Depths walleye were located in Hungry Mother Lake, April-August.



Located in Southwest Virginia, Hungry Mother Lake not only offers anglers a great place to fish for walleye, but an opportunity to explore one of Virginia's premier state parks.



Depths walleye were located in Hungry Mother Lake, November–January.

One hundred walleye were fitted with Floy reward tags in 1997. Anglers returned tags from 32 fish that year. This represents a fairly high success rate for walleye angling. Most successful anglers fished at night, from a boat, with artificial lures and specifically targeted walleye. Surprisingly, 48 percent of the walleye landed by anglers were released. April, May, and June are the best months to fish for Hungry Mother walleye.

areas were evident for all tagged

fish. Individual walleye often uti-

lized the same feeding or resting site

repeatedly. One particular sub-

merged tree was visited by nearly all

of the walleye tracked during the

study.

Lake Anna

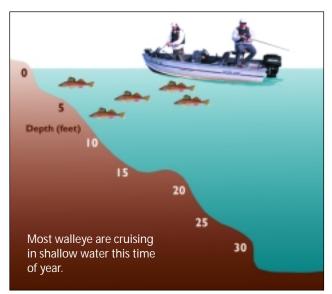
ake Anna is a 9.600-acre impoundment owned by Dominion Virginia Power. The lake is located in Spotsylvania, Louisa, and Orange counties and serves as cooling water for the North Anna Nuclear Power Station. Maximum depth is 80 feet with a mean depth of 25 feet. The lake weakly stratifies, and water temperature does not change dramatically from the surface to the bottom. Surface temperatures in the summer approach 90°F. Anglers and pleasure boaters heavily use the reservoir. Fishing pressure averages 180 hours per acre or 32,000 fishermen visits each year. The aquatic weed Hydrilla verticillata became established in Lake Anna during the late 1980's.

Fish stocking began in 1972 with the introductions of largemouth bass, bluegill, redear sunfish, and channel catfish. Subsequent stockings of striped bass and largemouth bass (both Florida and northern strains) were made. Threadfin shad and blueback herring were successfully introduced in the 1980s. Walleye have been stocked into Lake Anna annually since 1975. Stocking rates have been highly variable, ranging from 25-125 fingerlings per acre. Walleye fry were stocked in 1981, 1984, and 1985.

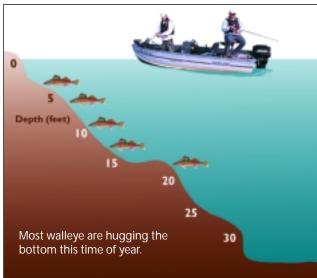
Walleye movements in Lake Anna were minimal, restricted largely to the immediate area near the stocking site. Prior to the study, all walleye were stocked into Lake Anna at the Route 522 boat ramp. Monthly tracking revealed that 78 percent of the time tagged walleye were located in the Pamunkey River from Route 522 to the

208

North Anna



Depths walleye were located in Lake Anna, December-February.



Depths walleye were located in Lake Anna, March-May.

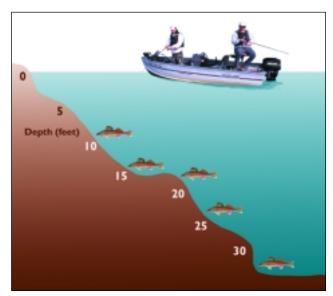
Areas of Lake Anna where walleye were located from April-May and September-February.

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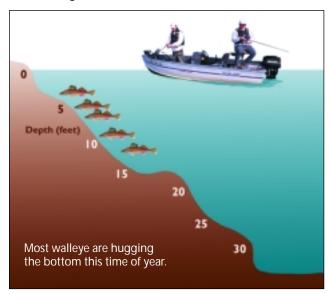
Dike 2

each fish = 5% of walleye location The more fish in an area increases an anglers chance of catching a walleye.

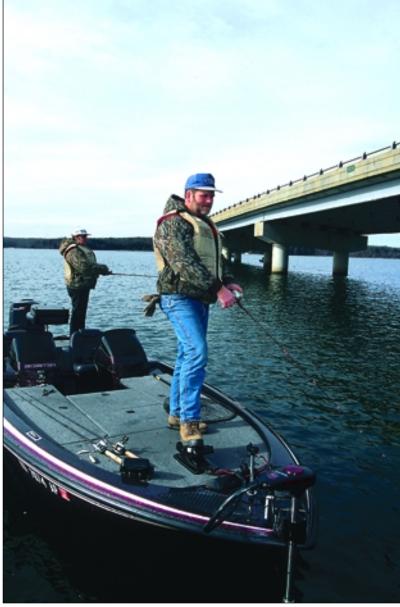
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Depths walleye were located in Lake Anna, June-August.



Depths walleye were located in Lake Anna, September–November.



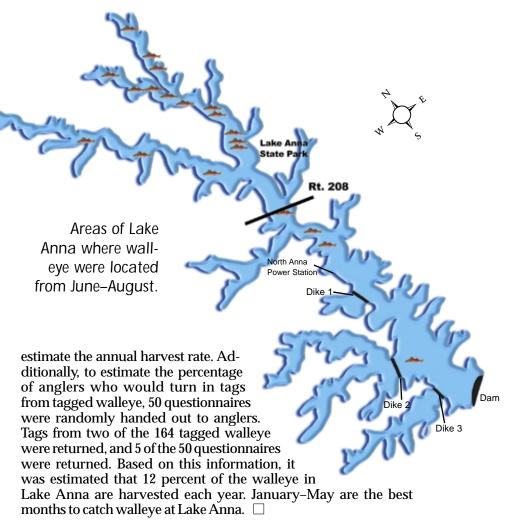
Fisheries biologists suggest anglers fishing for walleye should concentrate their efforts from the Rt.208 bridge to the upper end of the lake.

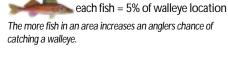
"splits" (within 2 miles of the stocking site); 14 percent of the time they were in the North Anna River from Route 522 to the splits; 6 percent of the time they were between the splits and Route 208, and 2 percent of the time they were located below Route 208. Walleye did not orient themselves to underwater structures at Lake Anna. They were located in water depths from 1–36 feet,

and temperatures 40–86°F. Fish were usually located in open, featureless water, usually near (below) a school of fish. The schools were assumed to be shad (gizzard, threadfin, blueback herring) or white perch. They were in open, featureless water more than 68 percent of the time. Occasionally they were near a point of land (11 percent) or near the creek channel (6 percent).

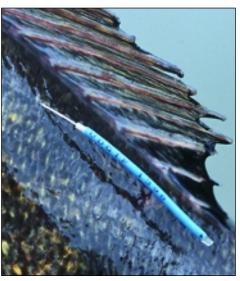
During the summer months they were in water depths between 14-32 feet (19 feet average). The rest of the year they occupied water less than 10 feet deep (on average). Tagged walleye were located in 85°F water in July–August, 70°F in September –October, and 43°F during the winter months.

One hundred sixty-four walleye were tagged at Lake Anna in 1999 to









To help track walleye, fisheries biologists placed Floy anchor tags, marked with a unique numeric code and the message "Reward Call (xxx)xxx-xxxx." Anglers who return the tags are given an embroidered baseball cap as a reward.

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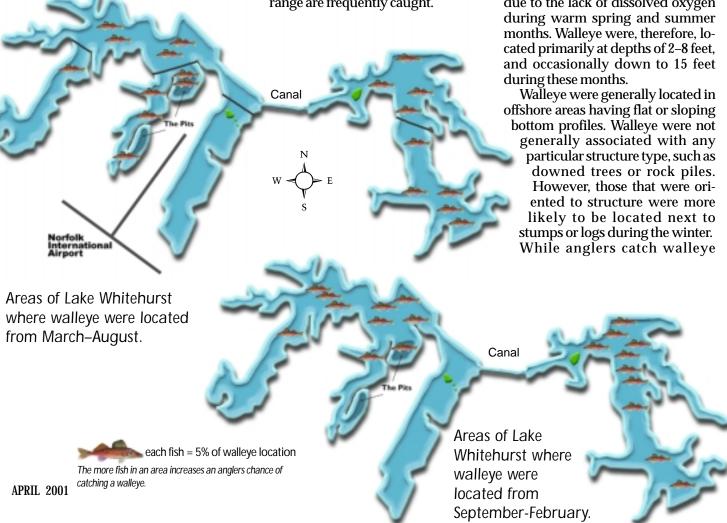
Lake Whitehurst

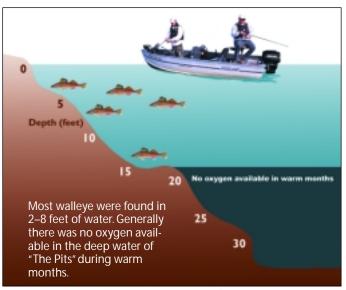
ake Whitehurst is a 458-acre water supply reservoir owned by the City of Norfolk, and it is located on that city's border with Virginia Beach. The lake is separated into two sections by a canal; the Lake Whitehurst section is located in Norfolk. and the Little Creek Reservoir section located in Virginia Beach. The two sections are managed together as Lake Whitehurst. The average water depth is 5 feet with depths generally ranging up to 9 feet, although several pits in the Lake Whitehurst section provide habitat to 32 feet. In addition to walleye, the lake supports populations of largemouth bass, chain pickerel, bluegill, redear sunfish, black crappie, and white catfish. Also, a few striped bass remain in the lake, having been stocked in the past.

Two public boat launch areas provide access to the lake. A dirt ramp off Northampton Boulevard provides boat access to the Little Creek section, and two paved ramps off Shore Drive provide boat access to the Lake Whitehurst section. A Norfolk City boat permit is required for boats with gas motors up to 12 horsepower allowed. Bank fishing is restricted to piers available at the Shore Drive access area (fee is required) and a pier at the Norfolk Botanical Gardens (admission fee required). The lake is closed at night.

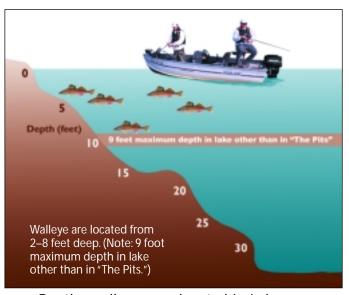
Walleye have been stocked into Whitehurst annually since 1974, and the lake has since become a walleye hot spot, with fish in the 4–6 pound range are frequently caught.

Beginning in March 1998, a oneyear walleye telemetry study was conducted on the lake during which time fish locations were monitored weekly. In the fall and winter months walleye were located throughout the Little Creek section and in the main portion of the Whitehurst section. These fish were found at depths ranging from 2-9 feet—the maximum depth available in these sections of the lake. During the spring and summer, walleye were located throughout the Little Creek section; however, in the Whitehurst section they were most likely to be located in the deep pits west of the Norfolk International Airport runway. Walleye were limited in their ability to seek out the cooler, deeper waters of "The Pits" due to the lack of dissolved oxygen during these months.





Depths walleye were located in Lake Whitehurst, March-August.



Depths walleye were located in Lake Whitehurst, September–February.

throughout the year, spring offers the best fishing in Whitehurst. Walleye are caught by deep-jigging with spoons, jigs, and grubs, by casting or trolling crankbaits, and by using night crawlers on bottom walker rigs. Interestingly, walleye in Whitehurst are caught throughout the day, with at least one angler claiming maximum success between the hours of 11:00 a.m. and 1:00 p.m. Walleye in Lake Whitehurst did not follow typical walleye activity patterns reported for other lakes throughout the United States.

Virginia Walleye Fact Sheet

- ♦ The walleye is a member of the perch family. Its name comes from the large, glossy eyes.
- ♦ Walleye are native to Southwest Virginia (Tennessee and Big Sandy drainage). They have been stocked into rivers, lakes, and reservoirs throughout the state.
- ♦ The Virginia Department of Game and Inland Fisheries stocks approximately 1 million walleye each year. Average stocking size is 1.3 inches in length.
- ♦ Although natural reproduction does occur in some Virginia rivers, survival is too low to maintain healthy populations. Supplemental stocking is necessary in most water bodies.
- ♦ An estimated 27,900 anglers (U.S. Fish and Wildlife Service, 1991) fish for walleye in Virginia.
- ♦ Virginia walleye are fast-growing, averaging 10" in length at age 1, 15" at age 2, and 18" at age 3.
- ♦ A typical 15" walleye in Virginia weighs 1.1 pounds; a 20" walleye should weigh approximately 2.7 pounds.
- ♦ More trophy-sized (5.0 pounds and greater) walleye are reported from Smith Mountain Lake than any other body of water in Virginia. It is followed by Kerr Reservoir, Philpott Reservoir, Claytor Lake, and Lake Anna. Other good walleye waters include Lakes Hungry Mother, Brittle, Flannagan, South Holston, Abel, and Whitehurst. Good walleye populations exist in the Staunton, New, Clinch, Appomattox, and James rivers.
- ♦ May is the best month to catch trophy-sized walleye. From 1986-1996, almost 22 percent of all citation walleye were caught in May; 16 percent in April, and 11 percent in March.
- ♦ Walleye have a life span of 7–12 years, but can live as long as 20 years. The oldest reported walleye in Virginia is age 12.
- ♦ The current state record walleye was caught in the New River. It weighed 15 pounds 15 ounces. The fish was caught by Anthony Duncan on December 15, 2000.

Conclusion

t's safe to say that as a result of this study we know more about Virginia walleve than ever before. At Lake Frederick and Hungry Mother Lake, walleye exhibited what might be considered "classic" habits. They were most active at night or in low light conditions, and generally sought refuge in the shade of standing timber or downed trees during the day. Their distribution changed through the seasons, but during a given season their locations and activity patterns were consistent, almost predictable. At Lake Brittle and Lake Whitehurst walleye behavior was not typical at all. They were quite active during the daylight hours and did not show a marked preference for visible structure. Seasonal movements were less evident and walleye roamed to a much greater extent. At Lake Anna, walleyes held in the same pattern most of the year.

One of the most important findings of this study was unexpected. Our study efforts confirmed what some of you have suspected. There are not as many walleye as we thought in some of our lakes. For example, Flannagan Reservoir and Lake Orange were slated as study sites for the walleye project, but the research was cut

short because walleye populations had declined so sharply in these systems. We have already taken steps to correct the population declines in these lakes and to prevent it from happening in other waters. Last year we launched a statewide walleye stocking plan that established eight priority waters and increased stocking rates and frequency in most lakes. Over the next few years we will be evaluating this new stocking plan to determine what works best in each type of lake that we manage.

All of this should be good news for walleye anglers. If you fish one of our study lakes, you now have specific information about where the walleye are at any given time of year. Even if your favorite walleye lake was not one of the waters we studied, you still may be able to benefit from the study. Compare the characteristics of your lake (average depth, forage type, and water clarity) to those described in this article. Find the closest fit, and put the data to the test by fishing for walleye where and when they should be active. Stay tuned, with the new walleye stocking plan in place the "good old days" of Virginia walleye fishing may be just around the corner. \Box

The Walleye Committee would like to thank the following people for all of their contributions to the project: Eric Brittle, Darrell Bowman, Rick Eades, Matt Fry, Dan Garren, Malika Heatwole, Clifford Kirk, Lee Martin, and John Odenkirk.

Virginia's Walleye Waters

The following waters are part of the new, statewide stocking plan for walleye. Each category will receive a different stocking rate based on management goals. Biologists are trying to develop outstanding walleye fisheries in priority waters by stocking walleye fingerlings at a higher rate per acre. In diversity waters, walleye are stocked to provide a diversity of fish for anglers to catch. Anomaly waters are managed in cooperation with other states (Gaston and South Holston), or are part of a special effort to re-establish a unique strain of walleye (Claytor and New River).

Water	County	Category
Lake Brittle	Fauquier	Priority
Burke Lake	Fairfax	Priority
Flannagan Res.	Dickenson	Priority
Lake Frederick	Frederick	Priority
Hungry Mother Lal	ke Smyth	Priority
Philpott Reservoir	Franklin	Priority
Lake Robertson	Rockbridge	Priority
Lake Whitehurst	City of Norfolk	Priority
Lake Anna	Spotsylvania, Louisa; Orange	Diversity
Lake Arrowhead	Page	Diversity
Lake Laura	Shenandoah	Diversity
Leesville Reservoir	Prince Edward	Diversity
Lunga Reservoir	Stafford	Diversity
Lake Orange	Orange	Diversity
North Fork of Pound Lake	Wise	Diversity
Sandy River Res.	Prince Edward	Diversity
Claytor Lake	Pulaski	Anomaly
Lake Gaston	Brunswick	Anomaly
South Holston Res.	Washington	Anomaly
New River	Pulaski, Wythe	Anomaly





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